

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Valves for use in Breathing Appliances

We, P. B. COW & COMPANY LIMITED, a company organised under the laws of Great Britain, of 470, Streatham High Road, London, S.W.16, and ARTHUR CHARLES WILLIAM HOOKER, a British Subject, of "Arnell", 41, Pinner Road, Pinner, Middlesex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to valves for use in breathing appliances such as respirators, dust masks and the like.

Breathing appliances are known which incorporate a disc or flap valve of flexible material, which covers an aperture, through which the air or gas stream passes, but the size of such a valve needed to cause minimum impedance to the air or gas flow is such as has given rise to complications in the design of the breathing appliance, and it is the principal object of this invention to provide a valve which can be incorporated in such breathing appliances, more conveniently than has hitherto been possible.

A valve for use in breathing appliances according to the present invention comprises two sheets of material secured together, one of which sheets is of a flexible nature and includes a number of flaps, the other sheet being formed with a corresponding number of holes, so arranged that each hole is completely covered by a flap in the other sheet, the flaps being free to lift to allow passage of fluid in one direction, and to close over the holes to prevent such fluid passage in the other direction.

The holed sheet may be of the same nature, that is to say of a flexible character, as the other, or may be of rigid material; the flaps in said other sheet may be formed by slitting or cutting the said sheet.

The two sheets may form an integral part of a breathing appliance or may be attached to or inserted in such a breathing appliance.

One embodiment of the invention is illus-

trated by way of example in the accompanying drawing, in which:—

Figure 1 is a front elevation of a valve. 50

Figure 2 is a sectional elevation thereof along the line XX, and

Figure 3 an enlarged detail.

Referring to the drawing, a flexible thermo-plastic sheet 1 has circular holes 2 punched in it, the holes 2 forming a regular lattice pattern. Flaps 3 having the shape of a U are cut in a similar sheet 4, the number and spacing of the flaps 3 corresponding to the number and spacing of the holes 2, so that, when the two sheets 1 and 4 are secured together in superimposed position, the holes 2 are completely covered by the flaps 3. The sheets 1 and 4 are united by heat welding or chemical bonding along lines 5 in two mutually perpendicular directions passing between the valve elements formed by the holes 2 and co-operating flaps 3, thus forming a chequer-board pattern. Each valve element is thus isolated from its neighbour. 70

In an alternative arrangement, the holes may be punched in a rigid sheet of thermo-plastic material and the U-shaped flaps cut in a thin flexible thermo-plastic sheet, so that, when the sheets are united, a rigid valve device is obtained. 75

It will be understood that any shape or size of hole may be used and the holes may be surrounded by a raised rim or may be counter-sunk in the sheet. 80

In the flapped sheet, the flaps may consist of U- or V-shaped cuts and again may have a formed or shaped rim corresponding to the rimmed holes, or again the flaps may be ribbed to give strength and to aid their opening and closing movements. 85

It will be appreciated that the sheets may be made of material other than thermo-plastic material, and may be secured together by any suitable means. 90

WHAT WE CLAIM IS:—

1. A valve for use in breathing appliances comprising two sheets of material secured together, one of which sheets is of a flexible

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- nature and includes a number of flaps, the other sheet being formed with a corresponding number of holes so arranged that each hole is completely covered by a flap in the other sheet, the flaps being free to lift to allow the passage of fluid in one direction and to close over the holes to prevent such fluid passage in the other direction.
2. A valve as claimed in Claim 1, in which the sheets are of thermo-plastic material and are secured together by heat welding.
3. A valve as claimed in Claims 1 or 2 in which the sheets are of thermo-plastic material and are secured together by chemical bonding.
4. A valve as claimed in Claims 1—3 in which the flaps are formed by slitting or cutting the flexible sheet, the flaps being U-shaped.
5. A valve substantially as described with reference to the accompanying drawing.

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PROVISIONAL SPECIFICATION

Valves for use in Breathing Appliances

- We, P. B. COW & COMPANY LIMITED, a company organised under the laws of Great Britain, of 470, Streatham High Road, London, S.W.16, and ARTHUR CHARLES WILLIAM HOOKER, a British Subject, of "Arnell", 41, Pinner Road, Pinner, Middlesex, do hereby declare this invention to be described in the following statement:—
- This invention relates to valves for use in breathing appliances, such as respirators, dust masks and the like.
- Breathing appliances are known which incorporate the disc or flap valve of flexible material, which covers an aperture, through which the air or gas stream passes, but the size of such a valve needed to cause impedance to the air or gas flow is such as has given rise to complications in the design of the breathing appliance, and it is the principal object of this invention to provide a valve which can be incorporated in such breathing appliances, more conveniently than has hitherto been possible.
- A valve for use in breathing appliances according to the present invention, comprises two sheets of material secured together, at least one of which sheets is of a flexible nature and includes a number of flaps, the other sheet being formed with a corresponding number of holes, so arranged that each hole is completely covered by a flap in the other sheet, the flaps being free to lift to allow passage of fluid in one direction, and to close over the holes to prevent such fluid passage in the other direction.
- The holed sheet may be of the same nature, that is to say a flexible character, as the other, or may be of rigid material; the flaps in said other sheet may be formed by slitting or cutting the said sheet.
- The two sheets may form an integral part of a breathing appliance or may be attached to or inserted in such a breathing appliance.
- In one embodiment according to the invention, circular holes are punched in a flexible thermoplastic sheet of desired thickness and U-shaped flaps are cut in a similar sheet, the number and spacing of the flaps corresponding to the number and spacing of the holes, so that, when the two sheets are secured together in superimposed position, the holes are completely covered by flaps. The sheets are united by heat welding or chemical bonding along lines in two directions passing between the valve elements formed by the holes and co-operating flaps, thus forming a chequer-board pattern. It will be appreciated that each valve is thus isolated from its neighbour by heat welding.
- In an alternative arrangement, the holes may be punched in a rigid sheet of thermoplastic material, and the U-shaped flaps cut in a thin flexible thermoplastic sheet, so that, when the sheets are united by heat welding, a rigid valve device is obtained.
- Any shape or size of hole may be used, and the holes may be surrounded by a raised rim or be counter-sunk in the sheet.
- In the flapped sheet, the flaps may consist of U- or V-shaped cuts and again may have a formed or shaped rim corresponding to the rimmed holes, or again the flaps may be ribbed to give strength and aid their opening and closing movements.
- It will be appreciated that the sheets may be made of material other than thermoplastic material, and may be secured together by any suitable means.

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This drawing is a reproduction of
the Original on a reduced scale.

